

WHAT IS CLAIMED IS:

1. A liquid crystal display device comprising:

a pair of substrates arranged facing each other with a pre-set gap in-between;

liquid crystals held in said gap;

means for applying an electrical field to said liquid crystals to change the state of orientation thereof;

a wall structure formed in each of small-sized areas obtained on sub-division along at least one substrate for orienting the liquid crystals lying in each small-sized area axially symmetrically on application of said electrical field; and

a groove structure formed in each of said small-sized areas and adapted for adjusting the axial symmetrical orientation of said liquid crystals in cooperation with said wall structure.

2. The liquid crystal display device according to claim 1 wherein said wall structure is formed for encircling a rectangular area and

wherein said groove structure is formed for extending along diagonal lines of said rectangular area.

3. The liquid crystal display device according to claim 2 wherein the liquid crystals in each small-sized area are divided into four groups and are oriented symmetrically with respect to an axis perpendicular to a point of intersection of said two diagonals lines.

4. The liquid crystal display device according to claim 1 wherein said one substrate

Sub
#1

said groove structure being formed by patterning at least one of said color filter layer, transparent insulating layer and the transparent electrically conductive layer.

wherein said groove structure is formed in an insulating layer formed in said electrode itself or in an insulating film arranged on a reverse surface or a front surface of said electrode.

wherein the surfaces of said two substrates are processed for orientation for orienting said liquid crystals perpendicularly in the absence of applied voltage.

8. The liquid crystal display device according to claim 1 wherein the axially symmetrical orientation of said liquid crystals is distorted along said axis and display is by exploiting optical rotating characteristics.

35

is added to said liquid crystals for ~~distorting~~ ^B the state of orientation thereof.

Sub
A3
10. The liquid crystal display device according to claim 1 wherein the axially symmetrical orientation of said liquid crystals is not distorted along said axis and display is by exploiting birefringence.

11. The liquid crystal display device according to claim 1 wherein said means for applying the electrical field is made up of signal electrodes formed in columns on one substrate and discharge channels formed in rows in the other substrate, said discharge channel being separated from said liquid crystals by a dielectric sheet. B

12. The liquid crystal display device according to claim 1 wherein said means for applying the electrical field is formed on both substrates and is facing electrodes with said liquid crystals in-between.

13. A method for the preparation of a liquid crystal display device comprising a pair of substrates arranged facing each other with a pre-set gap in-between;

liquid crystals held in said gap;

means for applying an electrical field to said liquid crystals to change the state of orientation thereof, said method comprising the steps of

forming a wall structure in each of small-sized areas obtained on sub-division along at least one substrate for orienting the liquid crystals lying in each small-sized area axially symmetrically on application of said electrical field; and

forming a groove structure formed in each of said small-sized areas and adapted for adjusting the axial symmetrical orientation of said liquid crystals in cooperation

Sub
At
end

with said wall structure.

09894566 052801